01-03-00 A

Express Mail: EL278372552US

Please type a plus sign (+) inside this box → +

PTO SB/05 (4/98)
Approved for use through 09/30/2000 OMB 0651-0032
Patent and Trademark Office U S DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number

UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 C F R § 1 53(b))

Attorney Docket No	RCA 89,657
First Inventor or Application Identifier	Wetzel
Title	Method and Apparatus for selecting...
Express Mail Label No.	EL278372552US

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents

ADDRESS TO: Assistant Commissioner for Patents, Box Patent Application, Washington, DC 20231

1. [X] * Fee Transmittal Form (e.g., PTO/SB/17) (Submit an original and a duplicate for fee processing)
2. [X] Specification [Total Pages 14] (preferred arrangement set forth below)
   - Descriptive title of the Invention
   - Cross References to Related Applications
   - Statement Regarding Fed sponsored R & D
   - Reference to Microfiche Appendix
   - Background of the Invention
   - Brief Summary of the Invention
   - Bnef Descnption of the Drawings (*if filed*)
   - Detailed Description
   - Claim(s)
   - Abstract of the Disclosure
3. [X] Drawing(s) (*35 U.S.C. 113*) [Total Sheets 4]
4. Oath or Declaration [Total Pages]
   a. [ ] Newly executed (original or copy)
   b. [ ] Copy from a prior application (37 C.F.R. § 1.63(d)) (*for continuation/divisional with Box 16 completed*)
      i. [ ] DELETION OF INVENTOR(S) Signed statement attached deleting inventor(s) named in the prior application, see 37 C.F.R. §§ 1.63(d)(2) and 1.33(b).

NOTE FOR ITEMS 1 & 13: IN ORDER TO BE ENTITLED TO PAY SMALL ENTITY FEES, A SMALL ENTITY STATEMENT IS REQUIRED (37 C.F.R. § 1.27), EXCEPT IF ONE FILED IN A PRIOR APPLICATION IS RELIED UPON (37 C.F.R. § 1.28).

5. [ ] Microfiche Computer Program (*Appendix*)
6. Nucleotide and/or Amino Acid Sequence Submission (*if applicable, all necessary*)
   a. [ ] Computer Readable Copy
   b. [ ] Paper Copy (identical to computer copy)
   c. [ ] Statement verifying identity of above copies

ACCOMPANYING APPLICATION PARTS

7. [ ] Assignment Papers (cover sheet & document(s))
8. [ ] 37 C.F.R.§3.73(b) Statement (*when there is an assignee*) [ ] Power of Attorney
9. [ ] English Translation Document (*if applicable*)
10. [ ] Information Disclosure Statement (IDS)/PTO-1449 [ ] Copies of IDS Citations
11. [ ] Preliminary Amendment
12. [X] Return Receipt Postcard (MPEP 503) (*Should be specifically itemized*)
13. [ ] * Small Entity Statement(s) (*PTO/SB/09-12*) [ ] Statement filed in prior application Status still proper and desired
14. [ ] Certified Copy of Priority Document(s) (*if foreign priority is claimed*)
15. [ ] Other: .....

16. **If a CONTINUING APPLICATION,** *check appropriate box, and supply the requisite information below and in a preliminary amendment:*
    [ ] Continuation [ ] Divisional [ ] Continuation-in-part (CIP) of prior application No: ____/____
    Prior application information: Examiner _____ *Group / Art Unit:* _____
    For CONTINUATION or DIVISIONAL APPS only: The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 4b, is considered a part of the disclosure of the accompanying continuation or divisional application and is hereby incorporated by reference. The incorporation can only be relied upon when a portion has been inadvertently omitted from the submitted application parts.

17. CORRESPONDENCE ADDRESS

[ ] *Customer Number or Bar Code Label* (*Insert Customer No. or Attach bar code label here*) or [X] *Correspondence address below*

Name	Joseph S. Tripoli Thomson Multimedia Licensing Inc.				
Address	PO Box 5312				
City	Princeton	State	NJ	Zip Code	08543-5312
Country	USA	Telephone	609-734-9443	Fax	609-734-9700

Name (Print/Type)	Robert D. Shedd	Registration No. (Attorney/Agent)	36,269
Signature	Robert D. Shedd	Date	12/30/99

Burden Hour Statement: This form is estimated to take 0.2 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Box Patent Application, Washington, DC 20231.

jc714 U.S. PTO 12/30/99

jc764 U.S. PTO 09/475444 12/30/99

Express Mail Label No. EL278372552US

METHOD AND APPARATUS FOR SELECTING A SATELLITE SIGNAL

CROSS REFERENCE TO RELATED APPLICATIONS

This application claims benefit of U.S. Provisional Application No. 60/144,456, filed July 19, 1999, and U.S. Provisional Application No. 60/_____, filed _____, 1999, which are hereby incorporated by reference in their entirety.

BACKGROUND OF THE INVENTION

1. Field of Invention

The present invention relates to a Direct Broadcast Satellite (DBS) system. More particularly, the invention relates to a method and apparatus for selecting one of a plurality of information signals broadcast from at least one satellite in the Direct Broadcast Satellite (DBS) system.

2. Description of the Background Art

Direct Broadcast Satellite (DBS) content providers have chosen to use multiple satellite networks to distribute their signals. In the past, a Low Noise Block converter (LNB) supply voltage (+13V/+18V) has been used to select between the two polarities of signals that were available on a single satellite network. Additionally, if signals from only two satellites are available for reception, then the presence or absence of a 22 KHz tone superimposed on the LNB supply voltage may be used to switch between either of the two satellite networks.

When the number of satellite networks grows beyond two, the voltage, and tone switching combination is no longer sufficient. One method to overcome this impediment is through bi-directional communications between an integrated receiver/decoder (IRD) and a satellite selector switch, such as used in the European standard known as DISEQ. The IRD sends a command signal to the selector switch to switch to a selected satellite network. The two-way (bi-directional) protocol provides an avenue for feedback from the switch to the IRD. Thus, in an instance where the IRD sends a command to the selector switch, the selector switch upon switching, sends an acknowledgement message back to the IRD.

However, not all satellite systems utilize bi-directional protocols, rather many utilize unidirectional messaging. The problem encountered by an integrated

receiver/decoder (IRD) using a unidirectional messaging system is that the IRD has no feedback from the switch. Thus, a message may be sent to the switch, nevertheless, the IRD has no way of knowing whether or not the switch actually received the message and then switched.

The lack of feedback may cause a problem if the user disconnects and reconnects the transmission coaxial cable, for example, in an attempt to reset the IRD and switch. The IRD will search for the lost satellite signal throughout each of the satellite networks by attempting to send messages to the switch, even though the switch is not connected to the IRD. When the user reconnects the switch via the coaxial cable, the switch will default to the prior transponder, which is not necessarily the transponder the IRD was expecting to switch to. Thus, the user will receive the wrong satellite signal.

Furthermore, the lack of feedback from the switch may cause a problem when the IRD sends a command signal that is degraded or incomplete (e.g., coaxial cable signal losses). In this instance, the switch may fail to properly select the correct transponder on a satellite or the correct satellite thereby sending the user an incorrect satellite signal.

Therefore, it is desirable to provide a method and apparatus for ensuring proper satellite network and transponder selection via the IRD and switch. It is also desirable to provide a form of feedback from the switch to indicate that the switch has failed to properly select a desired satellite signal.

SUMMARY OF INVENTION

The disadvantages heretofore associated with the prior art, are overcome by the present invention of a method and apparatus for selecting a specific satellite signal. Specifically, a user selects a satellite signal via an integrated receiver/decoder (IRD), from at least one satellite network. The IRD sends a command signal to a selector switch to switch to one of a plurality of low noise block converters (LNB) coupled to a satellite collector dish.

The command signal is transmitted from the IRD whenever the integrated receiver/decoder has not locked on to the satellite signal. Once the IRD acquires the satellite signal, the IRD repeats the transmission of the command signal to the selector switch. Thus, in the event that the selector switch failed to switch to the LNB

corresponding to the initial command signal, then the repeated command signal helps to ensure that the selector switch switches to the LNB corresponding with the latest command signal sent by the IRD.

BRIEF DESCRIPTION OF THE DRAWINGS

The teachings of the present invention can be readily understood by considering the following detailed description in conjunction with the accompanying drawings, in which:

FIG. 1 depicts a block diagram of a Direct Broadcast Satellite System;

FIGS. 2A and 2B depict a flow diagram of a method for selecting a broadcasted satellite signal from a satellite network; and

FIG. 3 depicts a flow diagram of a method for providing feedback to an integrated receiver/decoder from a device coupled via a unidirectional signal path.

DETAILED DESCRIPTION OF THE INVENTION

FIG. 1 depicts a block diagram of a direct broadcast satellite communications system 100. The direct broadcast satellite (DBS) system 100 comprises a service provider 130 from which audio, video, and/or data may be (hereinafter "satellite signal") uplinked to a satellite network comprising at least one satellite network 132. Each satellite network 132 includes a satellite 133 having a plurality of transponders for downlinking the satellite signal to a plurality of subscriber equipment 102 having satellite signal receiving capabilities. Subscriber equipment 102 for a single location is depicted in FIG. 1.

Specifically, a DBS service provider 130 provides hundreds of television channels including a program guide from which a subscriber may choose programming. The subscriber may select any channel via an input device 103 such as a remote control, for tuning an integrated receiver/decoder (IRD) 104 to the carrier frequency of the selected satellite signal. The direct broadcast satellite system 100, in conjunction with a method of requesting a satellite signal by a subscriber, as will be described in more detail hereinafter, advantageously ensures that the correct satellite signal is selected and coupled to the IRD 104.

In particular, the subscriber equipment 102 comprises the IRD 104 having a processor 106, a tuner 107, memory 108, and a datalink 105. The datalink 105 is

utilized in a digital IRD 104. In general, the tuner 107 tunes to a desired transponder frequency and down-converts that frequency to a baseband signal (e.g., approaching zero cycles/sec.) The baseband signals are sent to the datalink 105 where the baseband signals are converted from an analog to digital data format. The digital data is then sent to the memory 107 and processor 106 for storage and further processing, respectfully.

The IRD 104 is coupled to a selector switch 120, via a signal path 109 such as a coaxial cable or a common transmission line. The selector switch 120 comprises a controller 122 such as a microcontroller, and a plurality of switching devices 124 such as relays. Upon sending a subscriber request for information, the processor 106 of the IRD 104 sends a command signal (e.g., 22 kHz tone) via the coaxial cable 109, to the microcontroller 122 of the selector switch 120.

The selector switch 120 is at coupled to at least one collector dish 126_1 through 126_m (collectively, collector dishes 126). Each collector dish 126 has at least one low noise block (LNB) converter 128_1 through 128_p (collectively LNB 128) coupled to the collector dish 126 via a feedhorn (not shown). For example, an elliptical collector dish 126 may have three LNBs 128 coupled to a single feedhorn, wherein each LNB is capable of receiving signals from three distinct satellite networks 132.

Specifically, each relay 124 of the selector switch 120 is correspondingly coupled to at least one low noise block (LNB) converter 128 via at least one signal path 121_1 through 121_p (collectively signal paths 121). Each low noise block converter (LNB) is capable of selectively receiving the radiated signals from one of the satellite networks 132 and down-converting the satellite signal to an intermediate frequency (IF) signal. Thereafter, the IF signals travel via the signal path 121, through the selector switch 120 and to the IRD 104.

Satellites radiate microwave signal beams in various bandwidths having a range of frequencies such as the C-band (i.e., 3.7 to 6.425 GHz) and Ku-band (i.e., 10.7 to 18.1 GHz). Satellite television signals are polarized. This property of the satellite signals is used to improve spectrum efficiency in the satellite frequency bands. Two different types of polarization (i.e., the orientation of the electric field distal from the antenna) have been employed in satellite television applications.

Linear polarization has two alternate states, i.e., horizontal and vertical polarization (HP and VP). Similarly circular polarization has two alternate states, i.e.,

left hand, and right hand circular polarization (LHCP and RHCP). The IRD 104 is capable of determining the type of polarization for the satellite signal selected by a user. The IRD 104 then sends a 13 volt or 18 volt signal as part of the command signal to the LNB 128 to enable the LNB 128 to differentiate between the polarization states i.e., the LHCP and RHCP, or the HP and VP.

The IRD 104 may send as the command signal a 22 KHz tone to the selector switch 120, where the presence or absence of the tone is used to switch between two satellites. In an instance where more than two satellite networks exist, the command signal will provide a message containing the orbital slot pertaining to the selected satellite.

Accordingly, when the collector dish 126 receives the radiated signal from the satellite, the LNB 128 corresponding to the command signal sent by the IRD 104 is able to select and amplify the incoming polarized satellite signal to a level that can be demodulated by the IRD 104. Furthermore, the LNB 128 down-converts the incoming satellite signal to an intermediate frequency (IF), illustratively, from a 12 GHz range down to 1 to 2 GHz. The down-conversion is performed by the LNB 128 in order to minimize high cable loses, typically occurring at 4 and 12 GHz.

The IRD 104 locks onto the selected satellite signal, and the selected satellite signal is down-converted to the specific frequency pertaining to the program channel selected by the user. Thereafter, the satellite signal is demodulated and decoded into the audio, video, and/or data signal components. The audio, video, and/or data signal components are then sent to a subscriber output device 108 such as a television set, recorder, computer, or other processing or recording device.

FIGS. 2A and 2B depict a flow diagram of a method for selecting a broadcasted satellite signal from a satellite network. The method 200 starts at step 201 and proceeds to step 202 where a subscriber makes a request for information by selecting an information channel from their remote control device.

In step 204, an integrated receiver/decoder (IRD) receives the subscriber request and a processor of the IRD sends a command signal, such as a 22 KHz pulse width modulation tone, over a coaxial cable coupled to a selector switch having a microcontroller. The microcontroller of the selector switch decodes the command signal from the IRD to identify a signal path required to receive the satellite signal selected by the user.

In step 206, the microcontroller activates a relay in the selector switch to couple the IRD to a corresponding satellite signal collector dish having a low noise block converter (LNB). The corresponding LNB allows the collector dish to focus and downlink the radiated satellite signals from the service provider's satellite to the receiving elements of the selected LNB.

In step 208, the selected satellite signal is down-converted by the LNB to an intermediate frequency and then transferred through the selector switch and coaxial cable to the IRD. In step 210, the IRD acquires and locks on to the down-converted satellite signal and then the method 200 proceeds to step 212.

In step 212, the IRD repeats the transmission of the command signal to the selector switch. The repeated command signal is provided to ensure that the selector switch is not set to an LNB corresponding to a different transponder or satellite network carrying a satellite signal not requested by the IRD.

In step 214, if the selector switch is correctly coupled to the appropriate LNB to receive the selected satellite signal during the initial command signal (i.e., step 204), then the method 200 proceeds to step 216. In step 216, the repeated command signal is disregarded without consequence and the IRD continues to receive the same satellite signal without interruption. Thus the subscriber will receive the requested satellite signal as per the initial command signal sent by the IRD, without interference from the repeated command signal. The method 200 then proceeds to step 230 and ends.

Conversely, the selector switch may appear to be set to the wrong LNB from the perspective of the IRD. Such situation may occur when the IRD has lost the locked satellite signal.

When the satellite signal is lost, i.e., "unlocked", then the IRD sends out consecutive command signals to the selector switch in order to search for the lost satellite signal. The command signals are sent to the selector switch to switch amongst the LNBs until a satellite signal is received by the IRD. The unlocking of the satellite signal may occur due to noise in the system, such as degradation of the signal on the coaxial cable, or a disruption in the connection between the IRD and switch, illustratively caused by a user disconnecting the coaxial cable temporarily to reset the IRD and switch, or otherwise.

For example, if a user has been viewing a selected broadcast satellite channel and then disconnects the coaxial cable, the IRD will stop receiving the locked satellite signal. The IRD will then begin searching for the lost signal from the service provider. The search is performed by the IRD across the satellite network, which may include switching the LNBs between satellites if more than one satellite network exists.

Every time the IRD sends a command signal to the selector switch during the search, the IRD will assume the selector switch has switched according to the IRD's commands. However, the user, illustratively, has disconnected the coaxial cable in this instance, and therefore the IRD and selector switch are no longer coupled. Since the communications between IRD and switch is unidirectional, the IRD does not have any means to receive direct feedback from the selector switch after issuing a command signal. Therefore, the IRD mistakenly thinks the selector switch has responded to its commands, when in fact the selector switch has never received the command signals.

When the user reconnects the coaxial cable, the IRD will acquire the satellite signal of which the IRD was originally tuned and locked upon via the LNB. Notwithstanding, the tuner of the IRD will be set to a different channel since the IRD has been searching throughout the satellite network for a signal. Thus, this newly acquired signal received by the IRD is deemed the wrong signal by the IRD.

Therefore in step 214, if the selector switch is not correctly coupled to the appropriate LNB to receive the selected DBS signal, then in step 218, the repeated command sent signal by the IRD to the selector switch changes the selector switch setting to the correct LNB. In particular, the selector switch then activates the relay coupled to the LNB corresponding to the last command signal the IRD sent out during its search for the satellite signal. When the selector switch switches to the (correct) LNB corresponding to the repeated (latest) IRD command signal, the previous (incorrect) satellite signal is unlocked from the IRD.

The method 200 then proceeds to step 220, where the LNB receives, down-converts, and transfers the correct satellite signal to the IRD. In step 222, the IRD again acquires and locks upon the incoming satellite signal.

Once the IRD locks onto the satellite signal, in step 224, the processor of the IRD sends a repeated command signal to the selector switch. The repeated command

signal is sent since, in step 218, the IRD had become unlocked from the previous satellite signal and thereafter performed a signal search. Then, in step 226, the repeated command signal of step 222 is ignored and the IRD continues to receive and lock onto the same satellite signal without consequence.

Henceforth, there is no further interaction between the IRD and the selector switch since the two devices have correctly selected the appropriate LNB to receive the selected satellite signal during the previous command signal in steps 218 through 222. Thus the selector switch and LNB correlate with the command signal sent by the IRD.

In this manner, the method 200 is designed to send a command signal whenever the tuner of an IRD is not locked onto a satellite signal. Furthermore, whenever the tuner of an IRD does lock onto a newly acquired satellite signal, a repeated command signal is sent to the selector switch to ensure that the selector switch has selected and coupled to the appropriate LNB. The method 200 then proceeds to step 230, where it ends until a user either selects another satellite channel or the IRD becomes unlocked from the satellite signal for some other reason such as discussed herein.

In an instance where there is degradation in the command signal sent by the IRD, then a second inventive method provides a means of feedback to the IRD to take specific recourse. FIG. 3 depicts a flow diagram of a method for providing feedback to an integrated receiver decoder (IRD) from a device coupled via a unidirectional signal path. Specifically, method 300 provides feedback to an IRD in an instance where a command signal from the IRD to a selector switch is degraded or incomplete.

The method 300 starts at step 301, and proceeds to step 302 where the IRD sends a command signal to the selector switch to couple a low noise block converter LNB to the IRD to receive a satellite signal from a satellite network, as selected by a user.

In step 304, if the command signal is without degradation, then the method 300 proceeds to step 306. In step 306, the method 300 proceeds to method 200, beginning at step 206 as depicted in FIG. 2.

Alternatively, if, in step 304, the command signal is incomplete or degraded to the point that a microcontroller of the selector switch cannot determine which LNB is to be coupled to the IRD, then the method proceeds to step 308. In step 308, the

microcontroller terminates the satellite signal it is currently receiving. In this instance, the microcontroller deactivates or disconnects the active relay receiving the satellite signal. Thus, the satellite signal being broadcast from the satellite and received by the LNB is cut off at the selector switch, resulting in the IRD becoming unlocked from the satellite signal.

In step 310, the IRD begins to search for the lost satellite signal. The search by the IRD is performed by repeating the command signal it previously sent to the selector switch. Thereafter, the method 300 proceeds to step 312 where the method 300 returns to method 200, beginning at step 206 as depicted in FIG. 2.

In this manner, the method provides feedback to the IRD whenever the command signal sent by the IRD is degraded beyond the microprocessor of the selector switch's ability to determine which LNB is required to satisfy the command signal sent by the IRD. Thus, when the microprocessor terminates the currently received satellite signal, that act provides feedback to the IRD to let the IRD know that the command signal the IRD just sent was defective. Moreover, the IRD will know that the selector switch did not respond to IRD's command, and a repeated command signal must be issued.

It should be apparent to those skilled in the art that a novel method for ensuring a correct satellite signal is being received by a tuner of an integrated receiver/decoder (IRD) has been provided. In one embodiment, a method inventively repeats the command signal sent to the selector switch to couple the IRD with an LNB corresponding to the broadcast channel selected by a user, thereby providing redundancy. Additionally, in another embodiment, a method provides feedback to the IRD from the selector switch to force the IRD to send a repeated command signal in an instance that a prior command signal sent by the IRD was defective.

Although various embodiments that incorporate the teachings of the present invention have been shown and described in detail herein, those skilled in the art can readily devise many other varied embodiments that still incorporate these teachings.

What is claimed is:

1. A method of selecting a satellite signal comprising the steps of:

selecting said satellite signal via an integrated receiver/decoder;

sending a first command signal from said integrated receiver/decoder to a selector switch; and

sending a second command signal from said integrated receiver/decoder to said selector switch once said integrated receiver/decoder has acquired and locked onto said satellite signal.

2. A method of selecting a satellite signal comprising the steps of:

selecting said satellite signal via an integrated receiver/decoder (IRD);

sending a first command signal from said IRD to a selector switch;

switching in response to said first command signal, said selector switch to couple to a low noise block converter (LNB) corresponding to said first command signal;

acquiring and locking said IRD to the satellite signal;

sending a second command signal from said integrated receiver/decoder to said selector switch;

receiving and locking onto said selected satellite signal in the instance where said selector switch is coupled to said LNB corresponding to the first command signal; and

disregarding said second command signal.

3. The method of claim 2, further comprising the step of:

receiving and locking onto a non-selected satellite signal in the instance where said selector switch is coupled to said LNB not corresponding to the first command signal.

4. The method of claim 3, further comprising the steps of:

switching to said low noise block converter (LNB) corresponding to said second command signal; and

acquiring and locking the IRD to the satellite signal in response to said second command signal.

5. The method of claim 4, further comprising the steps of:

sending a third command signal from said integrated receiver/decoder to said selector switch;

receiving and locking onto said selected satellite signal in the instance where said selector switch is coupled to said LNB corresponding to the second command signal; and

disregarding said third command signal.

6. A method of selecting a satellite signal comprising the step of:

sending a command signal from said integrated receiver/decoder to said selector switch;

terminating said satellite signal currently being received by an integrated receiver/decoder (IRD);

repeatedly sending said command signal from said IRD to said selector switch; and

receiving and locking onto said selected satellite signal in the instance where a selector switch is coupled to said LNB corresponding to said command signal.

7. The method of claim 6, comprising the step of:

searching for said terminated satellite signal via said repeated command signals, after said selector switch terminated said currently received satellite signal.

8. Apparatus for selecting a satellite signal comprising:

means for selecting said satellite signal via an integrated receiver/decoder (IRD);

means for sending a first command signal from said IRD to a selector switch;

means for switching in response to said first command signal, said selector switch to couple to a low noise block converter (LNB) corresponding to said first command signal;

means for acquiring and locking said IRD to the satellite signal;

means for sending a second command signal from said integrated receiver/decoder to said selector switch;

means for receiving and locking onto said selected satellite signal in the instance where said selector switch is coupled to said LNB corresponding to the first command signal; and

means for disregarding said second command signal.

9. The apparatus of claim 8, further comprising:

means for receiving and locking onto a non-selected satellite signal in the instance where said selector switch is coupled to said LNB not corresponding to the first command signal.

10. The apparatus of claim 9, further comprising:

means for switching to said low noise block converter (LNB) corresponding to said second command signal; and

means for acquiring and locking the IRD to the satellite signal in response to said second command signal.

11. The apparatus of claim 10, further comprising:

means for sending a third command signal from said integrated receiver/decoder to said selector switch;

means for receiving and locking onto said selected satellite signal in the instance where said selector switch is coupled to said LNB corresponding to the second command signal; and

means for disregarding said third command signal.

12. Apparatus for selecting a satellite signal comprising:

means for sending a command signal from said integrated receiver/decoder to said selector switch;

means for terminating said satellite signal currently being received by an integrated receiver/decoder (IRD);

means for repeatedly sending said command signal from said IRD to said selector switch; and

means for receiving and locking onto said selected satellite signal in the instance where a selector switch is coupled to said LNB corresponding to said command signal.

13. The apparatus of claim 12, comprising:

means for searching for said terminated satellite signal via said repeated command signals, after said selector switch terminated said currently received satellite signal.

ABSTRACT

A method and apparatus for ensuring a correct satellite signal connection. Specifically, a user selects a satellite signal via an integrated receiver/decoder (IRD) from at least one satellite, and the IRD sends a command signal to a selector switch to acquire and lock onto said satellite signal. The IRD repeats transmission of the command signal to the selector switch once the IRD has acquired and locked onto said information signal. Thus, in the event that the selector switch failed to switch to a low noise block converter (LNB) corresponding to the initial command signal, then the repeated command signal helps to ensure that the selector switch switches to the LNB corresponding with the latest command signal sent by the IRD.

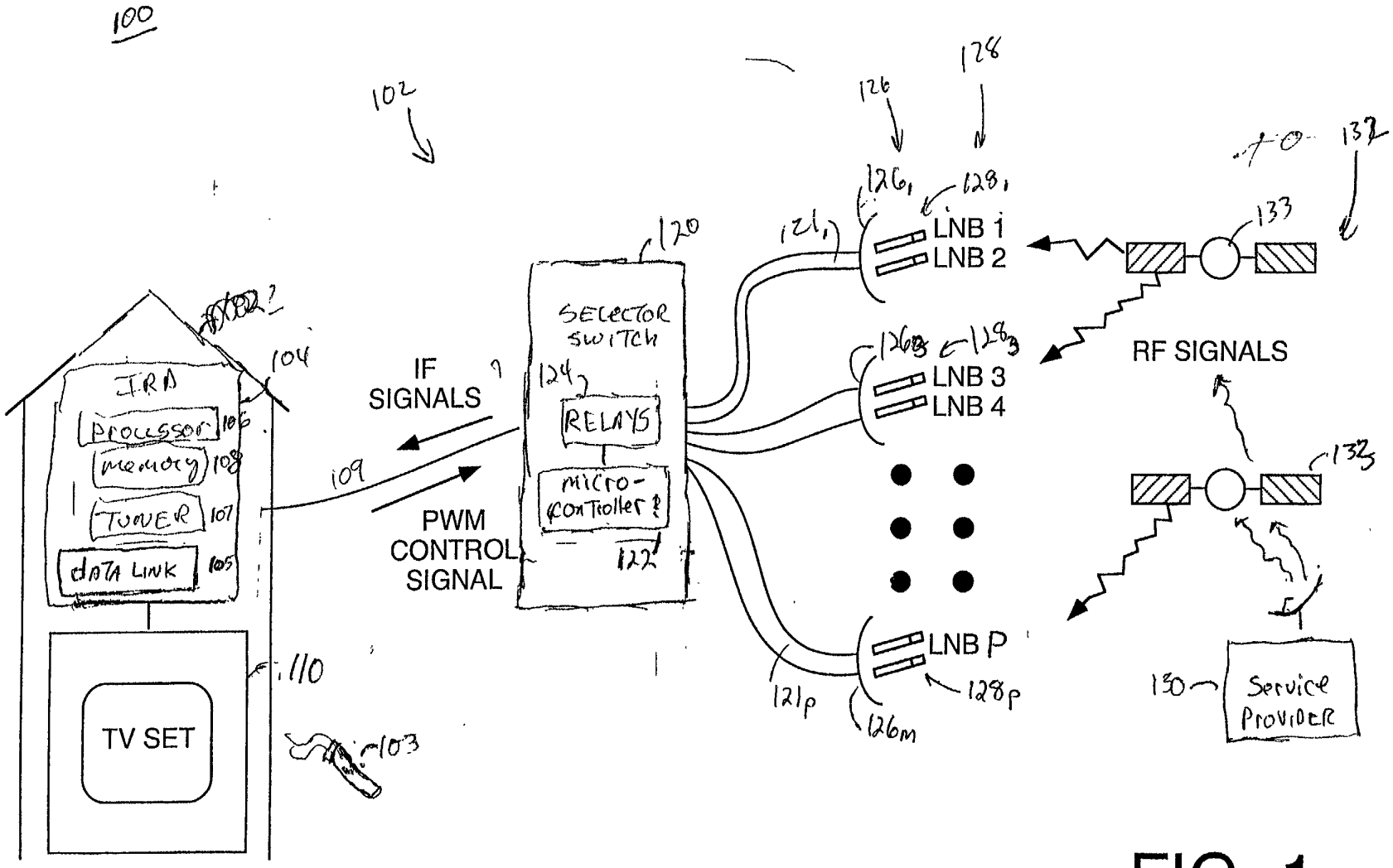

100
102
126
128
126₁
128₁
LNB 1
LNB 2
133
132
120
121₁
SELECTOR SWITCH
124
RELAYS
MICRO-CONTROLLER
122
IF SIGNALS
PWM CONTROL SIGNAL
109
104
IRD
PROCESSOR
MEMORY
TUNER
DATA LINK
105
107
108
106
110
TV SET
103
126₃
128₃
LNB 3
LNB 4
RF SIGNALS
132₃
LNB P
128P
121P
126m
130
Service Provider

FIG. 1

FIG. 2A

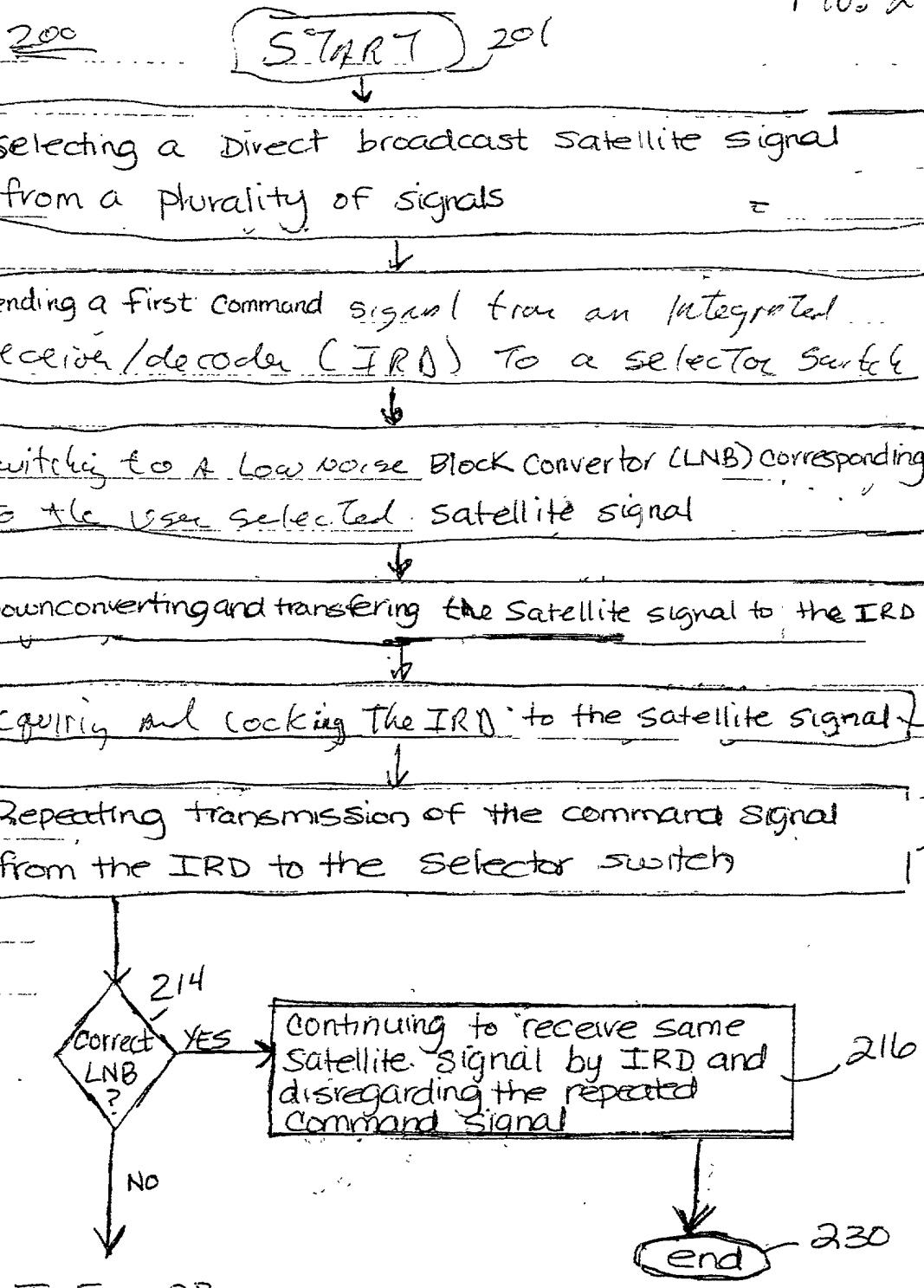

200
START
201
selecting a Direct broadcast Satellite signal from a plurality of signals
202
sending a first Command signal from an Integrated Receiver/decoder (IRD) To a selector Switch
204
Switching to A Low noise Block Convertor (LNB) corresponding To the User selected satellite signal
206
Downconverting and transfering the Satellite signal to the IRD
208
Acquiring and Locking The IRD to the satellite signal
210
Repeating transmission of the command signal from the IRD to the Selector switch
212
214
Correct LNB ?
YES
Continuing to receive same Satellite signal by IRD and disregarding the repeated Command signal
216
NO
end
230
To FIG. 2B

FIG. 2B

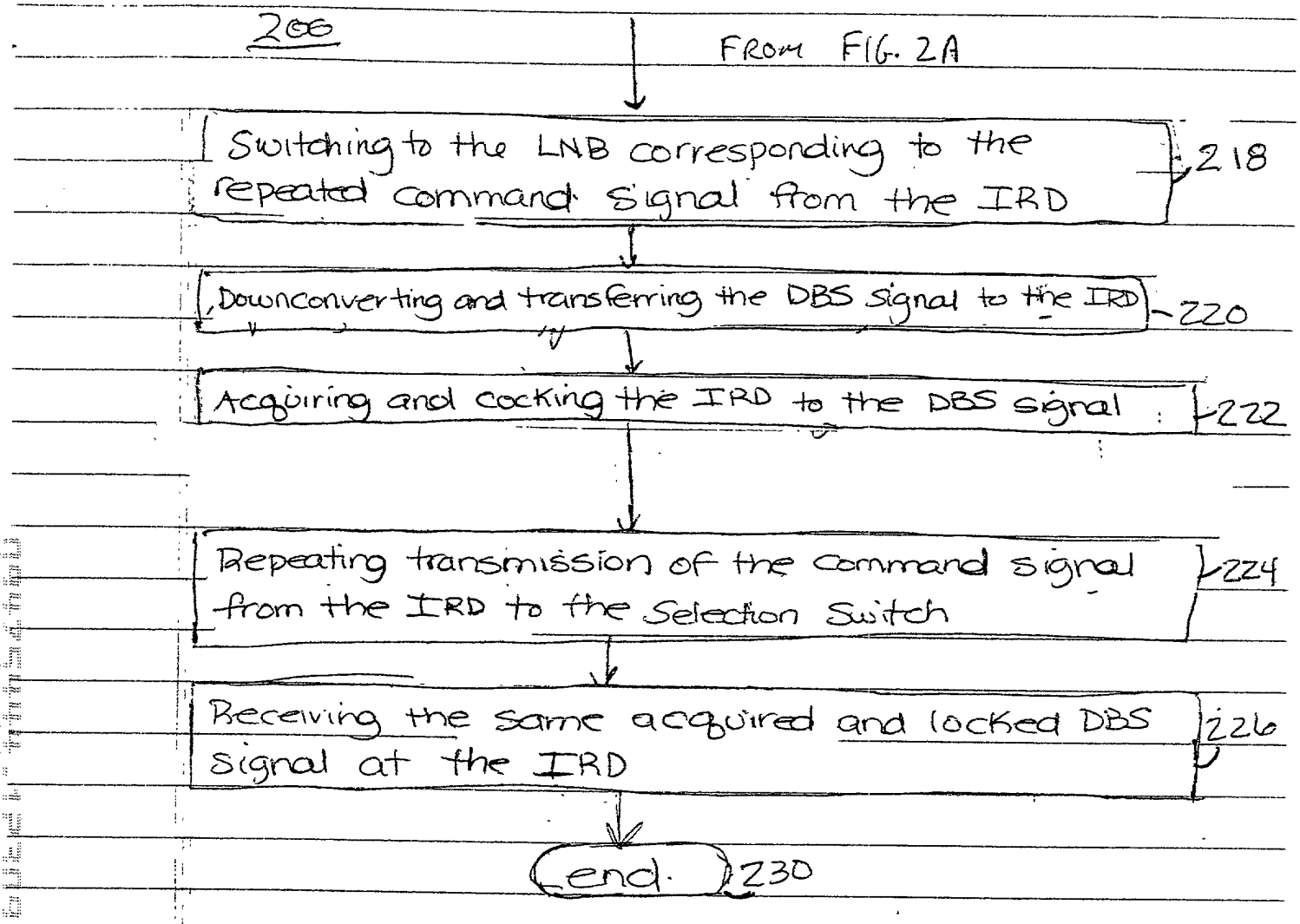
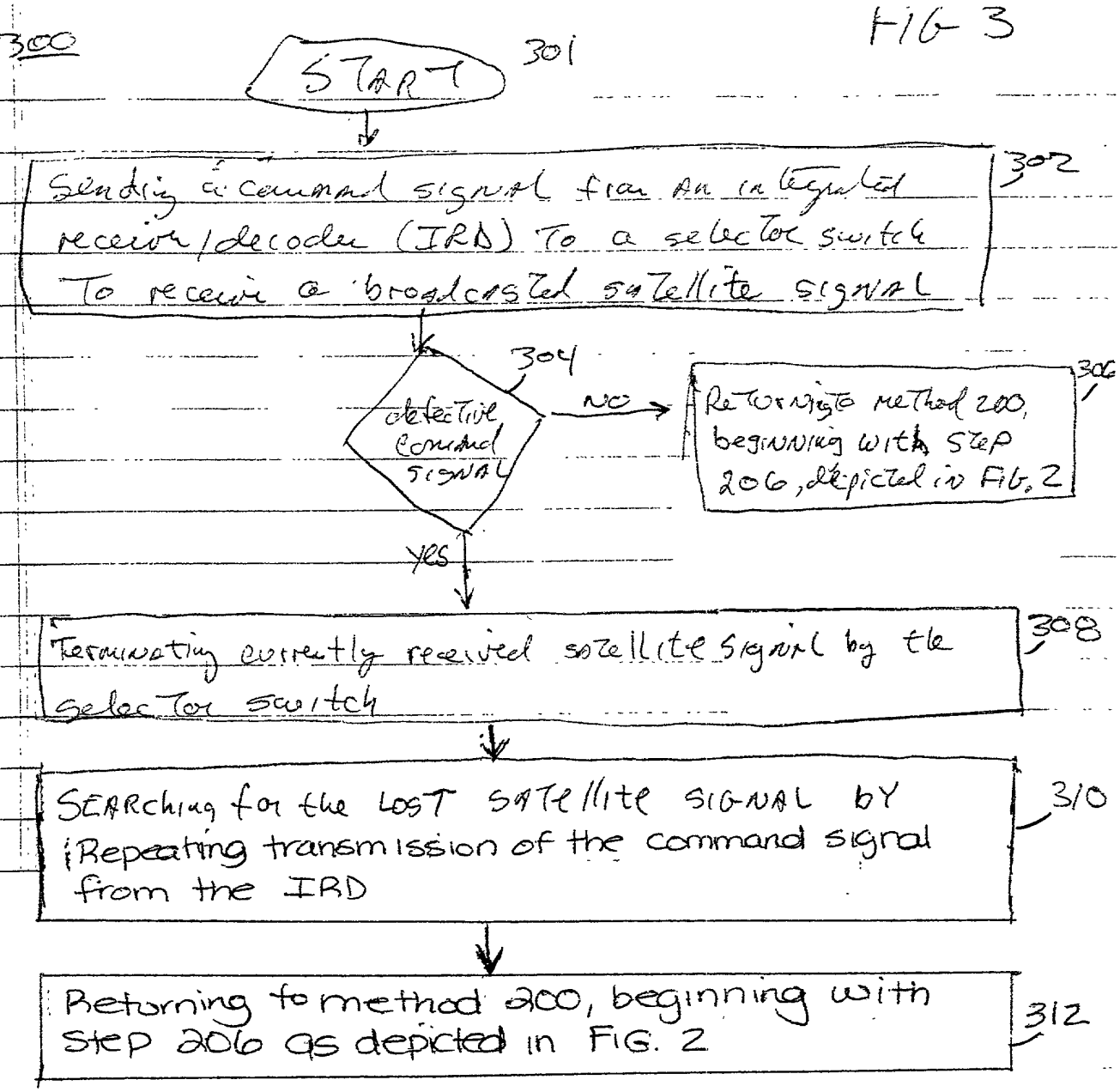

200
FROM FIG. 2A
Switching to the LNB corresponding to the repeated command signal from the IRD
218
Downconverting and transferring the DBS signal to the IRD
220
Acquiring and locking the IRD to the DBS signal
222
Repeating transmission of the command signal from the IRD to the Selection Switch
224
Receiving the same acquired and locked DBS signal at the IRD
226
end.
230

FIG 3


300
START
301
Sending a command signal from an integrated receiver/decoder (IRD) To a selector switch To receive a broadcasted satellite signal
302
304
detective Command signal
NO
Returning to method 200, beginning with step 206, depicted in Fig. 2
306
YES
Terminating currently received satellite signal by the selector switch
308
SEARching for the LOST SATELLITE SIGNAL BY iRepeating transmission of the command signal from the IRD
310
Returning to method 200, beginning with step 206 as depicted in FIG. 2
312